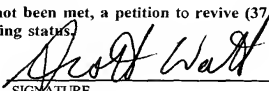


JC19 Rec'd PCT/PTO 22 FEB 2002

FORM PTO-1390 (REV. 12-2001)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				11696.0047	
				U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	
INTERNATIONAL APPLICATION NO. PCT/GB00/03087		INTERNATIONAL FILING DATE 10 August 2000		PRIORITY DATE CLAIMED 25 August 1999	
TITLE OF INVENTION SYSTEM AND APPARATUS FOR AVOIDING INTERFERENCE BETWEEN FIXED AND MOVEABLE BASE TRANSCIEVER STATION					
APPLICANT(S) FOR DO/EO/US CLARKE, MatthewAlexander and BALMBRA, Duncan Paul					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<p>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</p> <p>4. <input type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p>a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</p> <p>b. <input checked="" type="checkbox"/> has been communicated by the International Bureau.</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <p>a. <input type="checkbox"/> is attached hereto.</p> <p>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</p> <p>b. <input checked="" type="checkbox"/> have been communicated by the International Bureau.</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input checked="" type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p> <p><b>Items 11 to 20 below concern document(s) or information included:</b></p> <p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment.</p> <p>14. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</p> <p>15. <input type="checkbox"/> A substitute specification.</p> <p>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input checked="" type="checkbox"/> Other items or information: International Search Report International Preliminary Examination Report</p>					

JC19 Rec'd PCT/PTO 2 2 FEB 2002

U.S. APPLICATION NO. (known as serial) <b>10/069223</b>		INTERNATIONAL APPLICATION NO. <b>PCT/GB00/03087</b>		ATTORNEY'S DOCKET NUMBER <b>11696.0047</b>	
<b>21. <input checked="" type="checkbox"/> The following fees are submitted:</b> <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. .... <b>\$1040.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO. .... <b>\$890.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. .... <b>\$740.00</b>  International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4). .... <b>\$710.00</b> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4). .... <b>\$100.00</b> <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>CALCULATIONS PTO USE ONLY</b>	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492(c)). <input type="checkbox"/> 20 <input type="checkbox"/> 30				\$	
<b>CLAIMS</b>	<b>NUMBER FILED</b>	<b>NUMBER EXTRA</b>	<b>RATE</b>	\$	
Total claims	12 - 20 =	0	x \$18.00	\$ .00	
Independent claims	3 - 3 =	0	x \$84.00	\$ .00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00	\$ .00	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$ 890.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$	
<b>SUBTOTAL =</b>				\$ 890.00	
Processing fee of <b>\$130.00</b> for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492(f)). <input type="checkbox"/> 20 <input type="checkbox"/> 30				\$	
<b>TOTAL NATIONAL FEE =</b>				\$ 890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +				\$	
<b>TOTAL FEES ENCLOSED =</b>				\$	
				Amount to be refunded:	\$
				charged:	\$
<p>a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>890.00</u> to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>19-4293</u>. A duplicate copy of this sheet is enclosed.</p> <p>d. <input type="checkbox"/> Fees are to be charged to a credit card. <b>WARNING:</b> Information on this form may become public. <b>Credit card information should not be included on this form.</b> Provide credit card information and authorization on PTO-2038.</p>					
<p><b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.</b></p>					
<p>SEND ALL CORRESPONDENCE TO:  <b>Stuart T. F. Huang</b>  <b>Stephoe &amp; Johnson LLP</b>  <b>1330 Connecticut Avenue, N.W.</b>  <b>Washington, DC 20036</b>  <b>Tel: (202) 429-3000</b>  <b>Fax: (202) 429-3902</b></p>					
				 SIGNATURE <b>Scott D. Watkins</b> NAME <u>36,715</u> REGISTRATION NUMBER	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Group Art Unit: Not Yet Assigned

MATTHEW A. CLARKE ET AL

Examiner: Not Yet Assigned

Serial No.: Not Yet Assigned

Filed: Herewith

For: SYSTEM AND METHOD FOR  
AVOIDING INTEFERENCE  
BETWEEN FIXED AND MOVABLE  
BASE TRANSCEIVER STATION

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Box Patent Application  
Washington, D.C. 20231

Sir:

Please amend the above-identified application as follows:

**IN THE CLAIMS:**

Please cancel claims 1-8 without prejudice.

Please add the following new claims 9-20 as follows:

--9. A method for providing cellular service aboard a ship, comprising:

providing first and second cellular coverage zones, the first zone being  
substantially confined to an interior of the ship and the second zone providing an  
effective range of coverage above-deck or outside the ship;

reducing, in response to interference above a desired level between the second  
zone and a land-based cellular node, the effective range of coverage of the second zone;

wherein said reducing does not change the area covered by the first cellular  
coverage zone.

10. The method of claim 9, wherein said reducing the effective range of coverage lowers the interference to below the desired level.

11. The method of claim 10, further comprising:  
suspending the provision of cellular service in the second zone in response to the interference exceeding the desired level regardless of said reducing; and  
continuing cellular service in the first zone during said suspending.

12. A method of providing ship-based cellular service aboard a ship as the ship approaches another cellular network, the method comprising:  
providing, when the ship is outside of a first predetermined distance from the another cellular network, a first effective range for the ship-based cellular coverage;  
maintaining, when the ship is outside of a second distance from the another cellular network but within the first distance, the ship-based cellular service at a second effective range, which is smaller than the first effective range; and  
suspending said ship-based cellular service when the ship is within the second distance.

13. The method of claim 12, wherein the first effective range is substantially fixed.

14. The method of claim 12, wherein the second effective range is variable.

15. The method of claim 12, wherein the first distance is a minimum distance at which the first effective range of the ship-based cellular service will not provide cellular service to users within the another cellular network.

16. The method of claim 12, wherein the second distance is a minimum distance at which the second effective range of the ship-based cellular service will not overlap with a predetermined area around the another cellular network.

17. The method of claim 12, wherein the first distance is a minimum distance at which the first effective range of the ship-based cellular service will not extend into the area determined by the second distance.

18. The method of claim 12, wherein the second distance is based on an outer boundary set by a controlling legal authority within which said ship is not permitted to provide cellular service.

19. The method of claim 12, wherein the ship-based cellular coverage is a first ship-based cellular coverage that extends above deck and outside the ship, the method further comprising:

providing a second ship-based cellular coverage that extends below deck independent of said providing the first ship-based cellular coverage;

wherein said providing a second first ship-based cellular coverage is not interrupted by said maintaining or said suspending.

20. A ship, comprising:

first and second sections of said ship, said first section including the external portions of the ship and said second section including at least below decks areas of said ship;

first and second cellular networks dedicated to said first and second sections, respectively;

means for controlling an effective range of the first cellular network to prevent the first cellular network from providing cellular service to cellular devices outside the legal jurisdiction of the ship;

wherein an effective range of the second cellular network does not change in association with a change in the effective range of the first cellular network.

21. The ship of claim 20, wherein said means for controlling will set the effective range of the first cellular network to:

a predetermined level when the effective range does not overlap with the coverage of another cellular network;

a reduced level when the predetermined level would overlap with the coverage of another cellular network; and

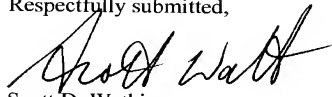
zero when overlap cannot be avoided regardless of how small the reduced level is.--

#### REMARKS

In view of the foregoing, early action on the merits is respectfully requested.

Date: February 22, 2002

Respectfully submitted,



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SYSTEM AND APPARATUS FOR AVOIDING INTERFERENCE BETWEEN FIXED AND MOVEABLE  
BASE TRANSCEIVER STATION

This invention relates to mobile telephony, and in particular to systems for use on board vehicles.

5           There has been considerable activity in recent years in proposals to allow the use of mobile telephones in environments where conventional cellular telephony base stations cannot provide coverage, in particular on board ships and aircraft. These vehicles frequently travel beyond the range of land-based cellular base stations, which typically have a range of the order of 1 to 10km.

10           For truly global coverage, satellite telephones are available. However, these are expensive and much heavier than a cellular telephone.

          A user without his own satellite telephone may use special facilities provided on board, such as the service provided to several airlines by the applicant company under the Registered Trade Mark "Skyphone". This uses onboard terminals  
15           connected, through a satellite link between the aircraft and a satellite ground station, to the telephone network. Another system, TFTS (terrestrial flight telephony system, marketed as "Jetphone"), operates in a similar manner, but uses a direct link between the aircraft and the ground station, without a satellite link. Similar systems are provided on board ships. However payment for these services is generally at the  
20           point of use (or prepaid), and may be in a foreign currency. Calls made to the user's cellular telephone will not be successful unless the calls can be diverted to the telephone number of the onboard user terminal (which will generally not be known to the caller), and any special facilities offered by the user's cellular network will in general be unavailable. A user with his own cellular telephone account which,  
25           through "roaming" agreements between network operators, can be used in many different countries, would therefore prefer to continue to use his cellular telephone subscription when travelling within or between these countries on board an aircraft or other vehicle.

          Proposals have also been made to allow a user to use his own cellular radio  
30           identity when using the satellite facility, instead of a special identity under the satellite system. This would allow billing to be made through the user's normal cellular radio account, and would also allow incoming calls made to his cellular telephone number to be received whilst travelling. To this end, systems have been

developed which allow call diversions to be set up to allow calls made to the user's cellular number to be transferred to a destination node of the tracking radio system. The destination node may be an onboard handset temporarily allocated the user's cellular identity, or it may be an onboard base station capable of wireless connection to the user's own cellular telephone. Systems of this general kind have been disclosed in International Patent Applications WO99/12227 (Nokia), WO94/28684 (Nordicetel) and WO98/26521 (Ericsson); European Patent Applications 0920147 (Alcatel) and 0915577 (Rohde & Schwartz), and United Kingdom Patent Application 2310973 (Motorola). An onboard base station can be integrated with other onboard systems, allowing local control of the base station's transmitter, and those of the mobile units with which it is co-operating, so as to keep their power within permitted limits.

There are a number of circumstances in which a cellular telephone system on board a ship could interfere with ordinary cellular base stations nearby. For example, when a ship is close to shore, the onboard cellular base station may be detectable on shore, and interfere with onshore stations. Within territorial waters use of the system may also breach regulatory conditions.

According to the invention, there is provided apparatus for providing telephone connection between one or more cellular radio telephones and a cellular radio switching system, comprising at least one moveable base transceiver station for providing a radio connection with the cellular radio telephones, and having means for detecting whether the moveable base transceiver station is in range of a fixed base transceiver station, and means for controlling the output of the moveable base transceiver station when such a fixed base transceiver station is detected such that transmissions from the moveable base station do not interfere with transmissions from the fixed base station within a predetermined area surrounding the fixed base station.

According to another aspect, there is provided a method for providing telephone connection between one or more cellular radio telephones and a cellular radio switching system, comprising one or more moveable base transceiver stations, wherein the operation of the moveable base transceiver stations is controlled when a fixed base transceiver station is detected such that transmissions from the moveable



base stations do not interfere with transmissions from the fixed base station within a predetermined area surrounding the fixed base station.

The output may be controlled by limiting the permitted time delay between the moveable base transceiver station and any co-operating mobile units, or by disabling  
5 some or all of the moveable base transceiver stations. In addition, the output may be controlled by detecting the geographical location of the moveable base transceiver stations, and controlling their output according to their position, using predetermined positional conditions.

Embodiments of the invention will now be described with reference to the  
10 Figures, in which:

Figures 1, 2 and 3 illustrate three embodiments of the invention.

Figure 4 illustrates the power control process of the invention.

Figure 5 is a flow chart showing a call diversion process, for use when the system has to be temporarily shut down.

15 The following embodiments illustrate the invention using a standard switched cellular network. However, the invention is applicable to other cellular networks, such as packet networks used to carry data over a distributed computer network such as the "Internet", carrying messages using formats such as the "Internet Protocol" (IP). Thus, unless the context clearly demands otherwise, any reference in this  
20 specification to switching includes the equivalent routing functions in a packet network of this kind.

Three embodiments of the invention will now be described, by way of example, with reference to Figures 1 to 3 of the drawings respectively. These  
25 embodiments are all based on the system architecture of the GSM (Global System for Mobile radio) standard, and are intended for use on board a ship. These embodiments differ in the location of the various components of the GSM system architecture, and the position of the satellite link in that architecture.

In all three embodiments, the system can be categorised into two main components: namely the shipboard part 501 and the fixed part 502, communicating  
30 with each other through a satellite connection 506. The fixed part 502 is itself in two parts, namely a satellite earth station 503 and a public land mobile network (PLMN) 504, which is in turn interconnected with other mobile networks 507 and fixed networks 505 to allow calls to be made between users of different networks.

The system provides a cellular radio subscriber with the ability to use his own handset 510 aboard a ship, located anywhere within an agreed satellite coverage area. The coverage aboard ship can be provided by any suitable means, using known radio repeater distribution systems 511 to provide radio coverage  
5 wherever required. The arrangement of Figure 1 will be described first.

The distribution system 511 is fed by a base transceiver site 512, for onward transmission to the satellite earth station 503 via a satellite tracking system 513. The satellite tracking system may be a conventional satellite telephone system as commonly used for ship-to-shore communications, providing a satellite link 506  
10 from the ship's satellite tracking system 513 to the satellite earth station 503. In the embodiment of Figure 1, the satellite earth station 503 is in turn connected to a Base Site Controller (BSC) 540 associated with the mobile switching centre (MSC) 541 of a conventional cellular telephone system. The satellite connection provides several voice channels and a signalling channel (supervisory control – management channel),  
15 and can be made by any connection of appropriate capacity.

In the cellular mobile network 504, standard GSM functionality is used. Both the base transceiver site 512 and the shore-based base site controller 540 are largely conventional, but have an extra software upload facility to allow for the delays incurred over the satellite link 503 - 506 - 513. In particular the "A-bis" link between  
20 a BTS and a BSC normally has an allowable time delay of 40ms. Longer delays are identified as being indicative of a fault and cause the link to be shut down. In this embodiment the allowable delay is expanded to approximately 700ms to allow for delays in the satellite link 503, 506, 513. The base site controller 540 operates in conventional manner, being connected to the mobile switching centre 541 of the  
25 host network 504. The host network 504 may also support one or more further base site controllers 542 controlling conventional base transceiver sites 543. The Mobile Switching Centre 541 also has an associated "Visitor Location Register" 544 which, in conventional manner, records details of the cellular telephones currently co-operating with the Mobile Switching Centre 541, so that details can be exchanged  
30 with the Home Location Register 571 of the user's home network for billing purposes, and to allow incoming calls to the handset 510 to be routed correctly. These details include the identity of the BSC 540, 542 to which the user is

connected, allowing different call charges to be applied for use in different cells, and in particular for calls made through the onboard base transceiver site 512.

Users aboard the ship will be able to use this service provided they are subscribers to the host network 504, or if they subscribe to a network 507 which  
5 has a "roaming" agreement with the host network 504, and the subscriber has global roaming authorised by his service provider. "Roaming" is the arrangement which allows a subscriber to one network to use his cellular telephone when connected to another network.

In use, both parties to a call, and the cellular network 504, operate normally.  
10 The cellular telephone 510 co-operates with the base station 512 on the ship as it would with any other base station 543. The home location register 571 identifies the cellular telephone 510 as currently served by the MSC 541, and routes incoming calls accordingly.

In second embodiment, shown in Figure 2, the Base Site Controller 514 is on  
15 the ship, and the satellite link 503 - 506 - 513 is between the MSC 541 and the BSC 514. This reduces the signalling overhead over the satellite link 503 - 506 - 513 as there is much less traffic between an MSC and a BSC than there is between a BSC and a BTS, so the cost of the satellite link can be reduced - perhaps to the extent that an on-demand satellite link may be preferable to a permanently leased one.  
20 Despite its onboard physical location, the BSC 514 is still perceived by the network 504 as part of the region served by the MSC 541.

In the third embodiment, shown in Figure 3, a subsidiary mobile switching centre 516 is provided on board the ship, with its own visitor location register 517. The satellite link 503 - 506 - 513 is now between the shore based MSC 541 and the  
25 onboard MSC 516. The user record in the HLR 571 will identify the mobile unit 510 as currently served by the onboard MSC 516, and route incoming calls (by way of the shore based MSC 541) accordingly. Alternatively, the HLR 571 may merely identify the mobile unit 510 as served by the network 504, and route the call to the MSC 541, which will in turn recognise from its entry in the shore based VLR 544  
30 that this mobile unit is currently being served by the subsidiary MSC 516.

This embodiment allows integration of the onboard MSC 516 with the ship's internal telephone exchange (PBX) 515. In particular it provides a simple means of providing passengers and crew with a "Wireless PBX" facility, as users on board the

ship can communicate with each other through the BSC 514 without using the satellite link 503 - 506 - 513. When a call is made by a cellular telephone 510, the serving MSC 516 first consults its VLR 517 to establish whether the called party is currently served by the same MSC 516. If this is the case, it connects the call  
5 without the use of any inter-MSC links. Thus, in this third embodiment, calls made between two users both on board the ship 501 may be made without the use of the satellite link 503 - 506 - 513.

If the ship 501 moves into radio range of land-based base transceiver sites 543, signals from the land-based sites may interfere with the onboard transceivers  
10 511, and vice versa. It is known for conventional land-based systems to experience similar problems from time to time as a result of variations in atmospheric conditions, or other factors affecting radio propagation such as temporary structures in the line of sight, or even whether trees are in leaf. Such land based systems can be arranged to select alternative frequencies or reduce signal strength if such interference is  
15 detected. However, the situation with a mobile base station 511 is more complex, and changes more often. In particular, the operator of the mobile base station 511 will not, in general, have a licence to operate within the territory covered by the fixed base stations 543, and may only be permitted to operate in, and be detectable in, international waters. This means that the system should be shut down when in  
20 territorial waters, so that users on board can operate with the local land-based system 543. Moreover, the power should be controlled so that if the mobile base stations are close to the boundary of territorial waters, other mobile users within territorial waters will nevertheless connect to a land-based station.

Figure 4 illustrates a typical situation. The system will be assumed to operate  
25 according to the general arrangement of Figure 2: that is the satellite link 503, 506, 513 is between the base site controller 514 and the mobile switching centre 541.

The ship 501 is outside territorial waters (boundary T) and there is a terrestrial base station 543 on the shore. The lower part of the diagram illustrates how the power output of an above-deck base station 511 is controlled at two  
30 locations 511a, (power received represented by full line) and 511b (power in dotted line) such that, in both cases, within the boundary T the received power is so low that a cellular telephone will not be able to register with it. The position of the boundary T relative to the ship 501 can be determined using any known navigation

system such as the satellite-based "Global Positioning System", using a GPS satellite 591 and receiver 590, linked to a database determining where such boundaries T are located.

To avoid interference with other radio systems outside territorial waters, and  
5 to prevent users in nearby vessels using the onboard system 511 in preference to the land-based system 543, the onboard system 501 may have means for detecting usable signals from a land-based transmitter 543 and switching off the onboard transmitters 511 when such signals are detected. This will allow users to connect to the onshore system 543. Transmitters serving areas below decks, where the onshore  
10 transmitter 543 cannot be detected, may remain switched on outside territorial waters.

Instead of power control, the system may be arranged to limit the time delay permitted on a base station to mobile station link. The time delay is usually limited to the length of one time slot in a time division system, usually 0.2ms, a round trip time  
15 equivalent to a distance of about 30km (sometimes extended to 0.4 ms (60km) over the sea to allow extended range, by allocating two timeslots per user). By limiting the permitted time delay to a few microseconds the effective range of the base station can be limited to the immediate vicinity of the ship, preventing mobile units on nearby vessels using the onboard system instead of the terrestrial one. In this way  
20 the system can be confined to users onboard the ship 501.

The shipboard system 501 is arranged to shut down, for example by discontinuing the satellite link 503 - 506 - 513, by switching off the onboard distribution network 511, or by other means, when operating in regions where  
operation of the system is not permitted, for example within territorial waters. Users  
25 of mobile telephones 510 on board the ship may then connect to the shore-based BTS 543. If the local network is not the network 504 to which the onboard BTS 512 is connected, users will "roam" from the host network 504 to the local network in conventional manner when such a transfer takes place. However, until the user does make such a transfer, the user's home network 507 will continue to operate as if the  
30 user is connected to the host network.

Figure 5 shows a process for intercepting calls when the onboard system 501 is switched off at times when its operation could interfere with conventional land-based cellular systems or with electronic control systems of the vehicle, to



## CLAIMS

1. Apparatus for providing telephone connection between one or more cellular radio telephones and a cellular radio switching system, the apparatus comprising at least one moveable base transceiver station for providing a radio connection with the cellular radio telephones, means for detecting whether the moveable base transceiver station is in range of a fixed base transceiver station, and means for controlling the output of the moveable base transceiver station when such a fixed base transceiver station is detected such that transmissions from the moveable base station do not interfere with transmissions from the fixed base station within a predetermined area surrounding the fixed base station.
2. Apparatus according to claim 1, wherein the means for controlling the output comprises means for limiting the permitted time delay between the moveable base transceiver stations and any co-operating mobile units.
3. Apparatus according to claim 1 or 2, wherein the means for controlling the output comprises means for disabling some or all of the moveable base transceiver stations.
4. Apparatus according to claim 1, 2 or 3, wherein the means for controlling the output comprises means for detecting the geographical location of the moveable base transceiver station, and controlling its output according to its position, using to predetermined positional conditions.
5. A method for providing telephone connection between one or more cellular radio telephones and a cellular radio switching system, comprising one or more moveable base transceiver stations, wherein the operation of the moveable base transceiver stations is controlled when a fixed base transceiver station is detected such that transmissions from the moveable base transceiver stations do not interfere with transmissions from the fixed base station within a predetermined area surrounding the fixed base station.

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6. A method according to claim 5, wherein the output is controlled by limiting the permitted time delay between the moveable base transceiver stations and any co-operating mobile units.
- 5 7. A method according to claim 5 or 6, wherein the output is controlled by disabling some or all of the base transceiver stations.
8. A method according to claim 5, 6, or 7, wherein the output is controlled by detecting the geographical location of the moveable base transceiver stations, and  
10 controlling their output according to their position, according to predetermined positional conditions.

15



(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

CORRECTED VERSION

(19) World Intellectual Property Organization  
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H04Q 7/36

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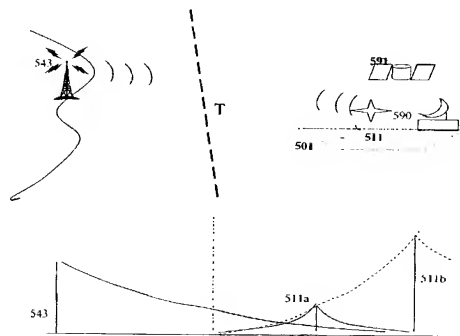
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[Continued on next page]

(54) Title: SYSTEM AND APPARATUS FOR AVOIDING INTERFERENCE BETWEEN FIXED AND MOVEABLE BASE  
TRANSCIVER STATION

(57) Abstract: Apparatus for providing telephone connection between one or more cellular radio telephones and a cellular radio switching system, comprises at least one moveable base transceiver station (511) for providing a radio connection with the cellular radio telephones, and having means for detecting whether the moveable base transceiver stations are in range of a fixed base transceiver station (543), and means for controlling the output of the moveable base transceiver stations (511) when such a fixed base transceiver station is detected such that transmissions from the moveable base stations do not interfere with transmissions from the fixed base station within a predetermined area surrounding the fixed base station (543). The system may also include a position finding system (590, 591), linked to the output control such that transmissions from the transmitter (511) cannot be detected within a predetermined area (T).

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see PCT Gazette No. 22/2002 of 30 May 2002, Section II

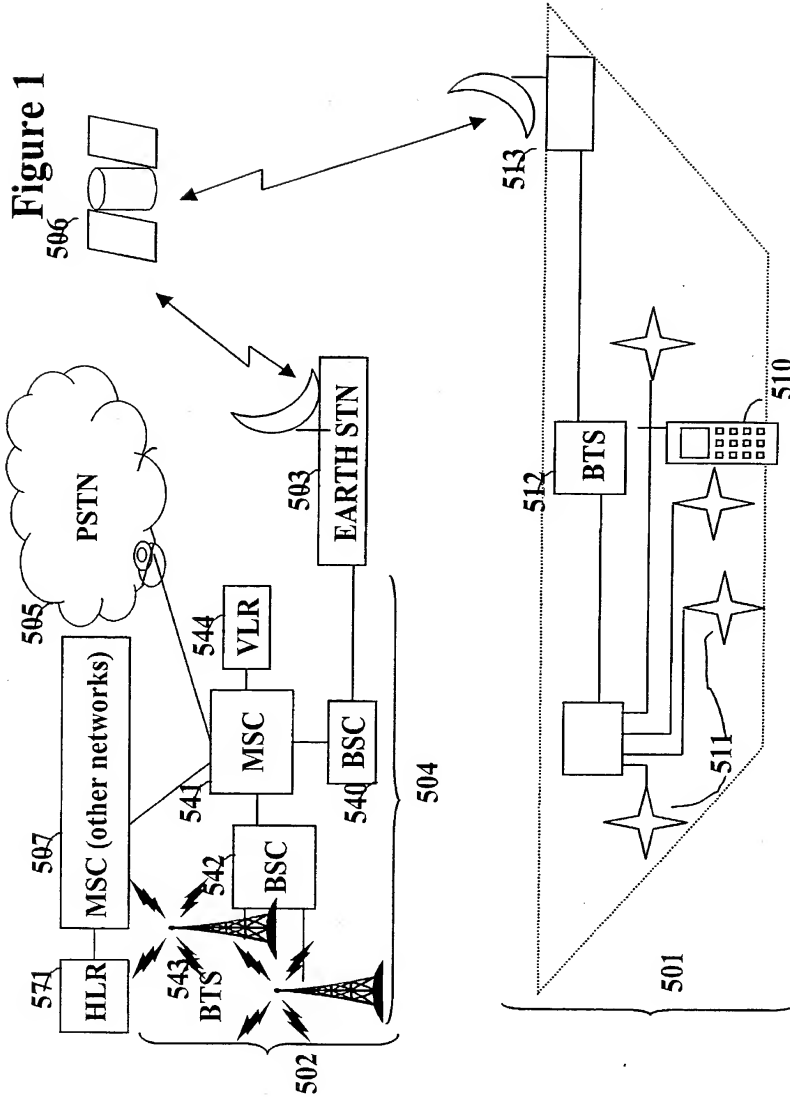
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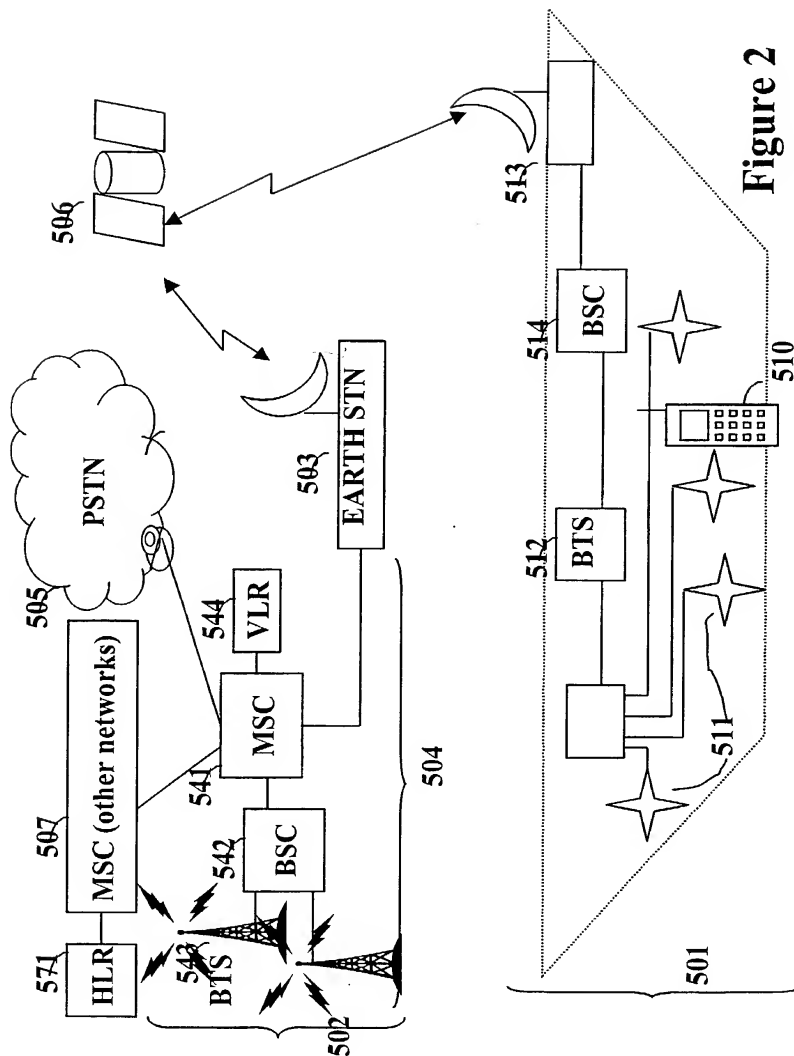
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Figure 1



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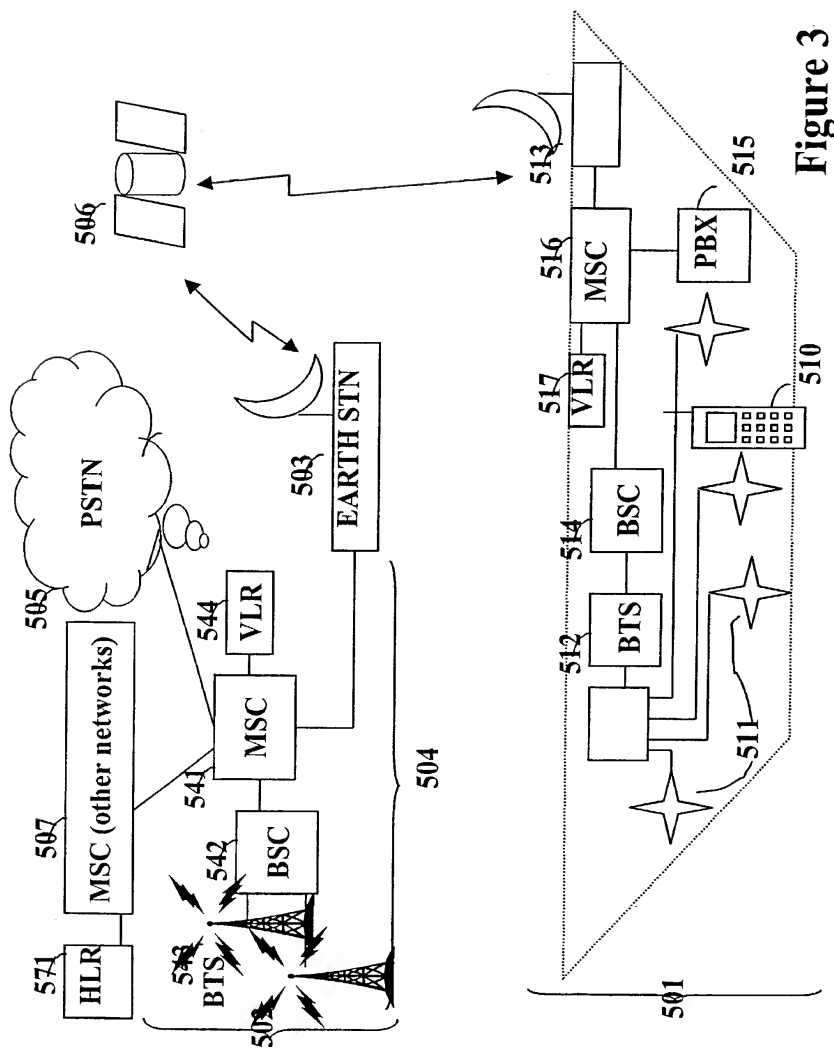
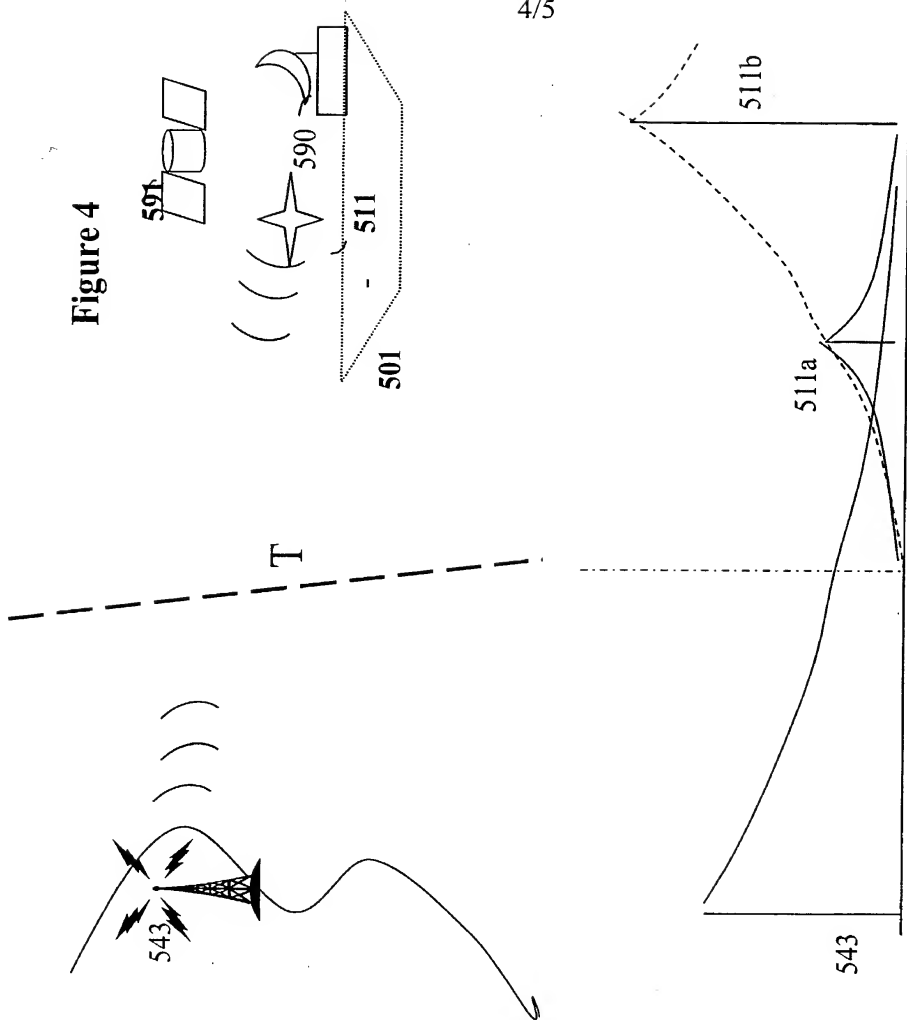
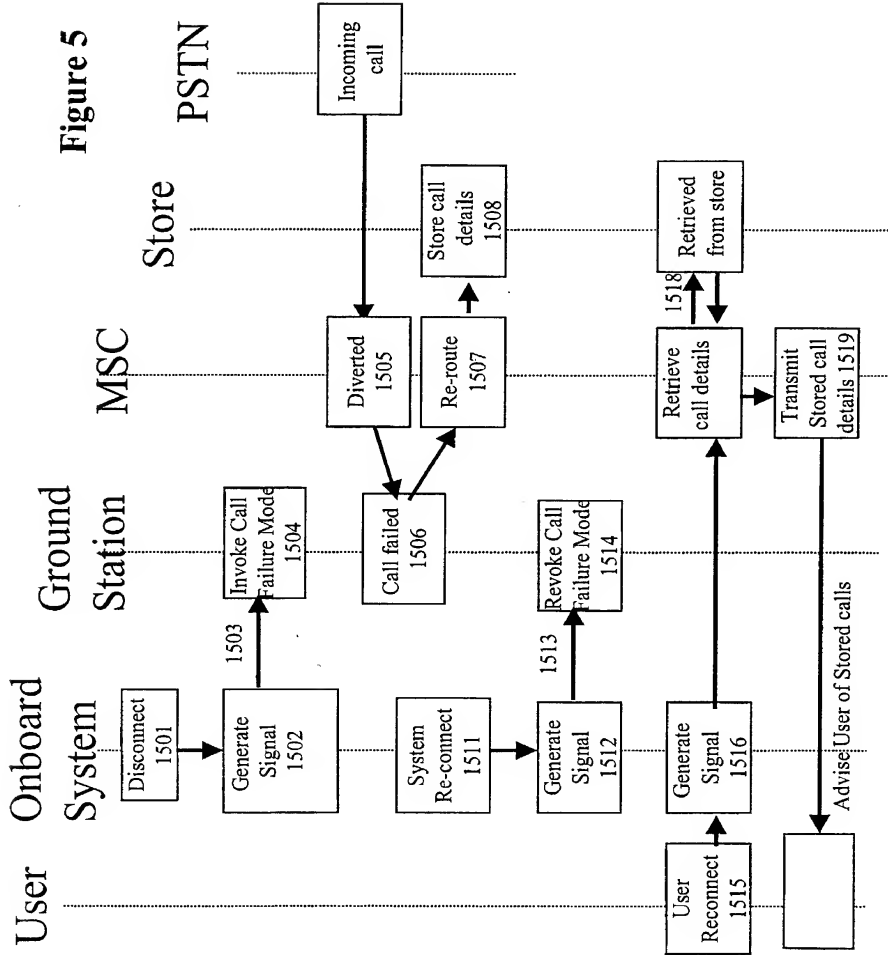


Figure 3

Figure 4



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<b>DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)</b> <input type="checkbox"/> Declaration Submitted with Initial Filing <input checked="" type="checkbox"/> Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(e)) required)	Attorney Docket Number	11696.0047
	First Named Inventor	MATTHEW A. CLARKE
	COMPLETE IF KNOWN	
	Application Number	10/069,223
	Filing Date	August 10, 2000
	Group Art Unit	
	Examiner Name	

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am an original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SYSTEM AND METHOD FOR AVOIDING INTERFERENCE BETWEEN FIXED AND MOVEABLE BASE TRANSCEIVER STATION

(Title of the Invention)

the specification of which

☐ is attached hereto  
OR

☒ was filed on (MM/DD/YYYY) 08/10/2000 as United States Application Number 10/069,223 or PCT International Application Number [ ] and was amended on 02/22/2002 (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification; including the claims, as amended by any amendment specifically referred to above.

POWER OF ATTORNEY: I hereby appoint the practitioner(s) named below to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Name	Registration Number
Stuart T. F. Huang	34,184
D. Douglas Price	24,514
Scott D. Watkins	36,715

SEND CORRESPONDENCE TO:	DIRECT TELEPHONE CALLS TO:
Stuart T.F. Huang Box PTO Steptoe & Johnson LLP 1330 Connecticut Avenue, N.W. Washington, D.C. 20036	Stuart T.F. Huang (202) 429-3000

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.



I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), 365(b) of any foreign application(s) for patent or inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Claimed	Certified Copy Attached?	
				YES	NO
99306763.6	GB	08/25/1999	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
00303164.8	GB	04/14/2000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability in 37 C.F.R. 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)
PCT/GB00/03087	08/10/2000	

I hereby declare that all statements made herein of own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First Inventor: Matthew Alexander Clarke  
(one given name w/o abbreviation plus any other given name or initial and family name)

Inventor's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Residence: \_\_\_\_\_

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Citizenship: \_\_\_\_\_

British

Mailing Address: \_\_\_\_\_

Windmill Cottage, Inworth Lane, Wakes Colne, Essex CO6 2BG, United Kingdom

120  
Full Name of Joint Inventor: Duncan Paul Balmbra  
(one given name w/o abbreviation plus any other given name or initial and family name)  
Inventor's Signature: *Duncan Balmbra*  
Date: 08/11/02  
Residence: 10 Denbeigh Place, Caversham, Reading, Berkshire RG1 8QE,  
United Kingdom *CBX*  
Citizenship: British  
Mailing Address: 10 Denbeigh Place, Caversham, Reading, Berkshire RG1 8QE,  
United Kingdom

<b>DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)</b> <input type="checkbox"/> Declaration Submitted with Initial Filing <input checked="" type="checkbox"/> Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(e)) required)	Attorney Docket Number	11696.0047
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Full Name of First Inventor: Matthew Alexander Clarke

(one given name/w/o abbreviation plus any other given name or initial and family name)

Inventor's Signature: *Matthew Alexander Clarke*

Date: 6/11/2002

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Full Name of Joint Inventor: Duncan Paul Balmbra  
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